

Database of Existing Hydrogen and Fuel Cell-related Courses and Research Activities at Universities

Elzbieta Tworek (Primary Contact)

University of Tennessee

2360 Cherahala Blvd.

Knoxville, TN 37932

Phone: (865) 946-1484; Fax: (865) 946-1314; E-mail: tworeke@ornl.gov

ORNL Technical Advisor: David Greene

Phone: (865) 946-1310; Fax: (865) 946-1314; E-mail: dlgreene@ornl.gov

DOE Technology Development Manager: Christy Cooper

Phone: (202) 586-1885; Fax: (202) 586-9811; E-mail: Christy.Cooper@ee.doe.gov

Objectives

- Develop a comprehensive online catalog of college and university programs teaching and conducting research in the areas of hydrogen and fuel cell technologies
- Categorize institutions by accreditation status; collect and organize information on institutions: location, unit offering program, research and course descriptions; gather data on faculty and their research interests
- Verify and maintain the database
- Launch the catalog on the web

Technical Barriers

This project addresses the following technical barriers from the Education section of the Hydrogen, Fuel Cells, and Infrastructure Technologies Program Multi-Year R,D&D Plan:

- A. Lack of Awareness
- C. Institutional Barriers and Access to Audiences

Approach

- Search web and review literature to determine if information is already accessible
- Determine accreditation level of programs to be included
- Identify conference and seminar participants as well as authors of specialized books and magazines affiliated with schools
- Gather information on faculty and institutions with an interest in hydrogen and fuel cell technology
- Verify credibility and accuracy (via web and personal interviews) of data yielded by research
- Organize information by institution and create a searchable online database of over 70 institutions within the scope of this phase
- Develop methods of collecting and verifying upcoming data

Accomplishments

- Documented current availability of educational opportunities related to hydrogen economy and fuel cell technologies

- Described programs and courses
- Collect data on faculty and research members

Future Directions

- Designed searchable online catalog for use by educators, students, advisors, and government agencies
- Confirm accuracy of data by creating a validation website for ongoing updates
- Launch the catalog on the web
- Increase number of tables linked to the main database, creating connections to individuals and research projects to help users refine searches
- Include statistics on Ph.D. graduates from institutions (e.g., number of dissertations on hydrogen and fuel cell topics, etc.)
- Include statistics of patent applications from affiliated institutions related to hydrogen and fuel cell technologies
- Increase and maintain information in the catalog

Introduction

The purpose of the Hydrogen, Fuel Cells and Infrastructure Technologies (HFCIT) Education Program is to develop and conduct an education and training campaign that communicates the long-term benefits and near-term realities of hydrogen fuel cell systems and related infrastructure. A necessary element of this goal is to achieve a level of awareness of hydrogen's benefits among educators, other key target audiences, and eventually the public, while supporting the creation of the skilled and informed workforce required for a hydrogen future. As the R,D&D Plan for Education notes, initial education efforts will focus on teachers and students, state and local governments, safety and code officials, and large-scale end-users, all of whom are critical to sustained education efforts. The catalog resulting from this study documents the current availability of educational opportunities related to the hydrogen economy and fuel cell technologies as an aid to these targeted audiences.

Approach

This research considered only institutions of higher education with engineering programs accredited by the Accreditation Board for Engineering and Technology (ABET). U.S. accreditation is a voluntary, non-governmental

process of peer review used to assure quality in educational institutions and programs. Most of the information included in the catalog has been gathered by searching university, library, and interest group web sites. The study has also identified people participating in conferences, seminars, or workshops covering hydrogen and fuel cell technology topics. Additionally, data has been accumulated by searching library databases and reviewing literature in the form of books, textbooks, conference proceedings, handbooks, industry and research-related overviews, government reports, and others. Information has also been obtained by phone and email contact with researchers and teaching faculty as well as authors of books related to hydrogen and fuel cells technologies.

The study includes over 70 institutions, describing them on specific levels of detail. However, the accuracy of some data is questionable since school webmasters and professors often do not update their pages frequently. Therefore, in order to deliver precise and exact information, the database will be validated and will be maintained on an ongoing basis by means of a validation web site. This kind of interactive web site would give the directors of the research programs and faculty members the opportunity to express their willingness to be included in the catalog as well as to view and modify the data presented.

Results

A catalog has been developed in the form of a searchable database that categorizes detailed information about institutions offering research programs or courses related to hydrogen or fuel cell technologies. The catalog includes the following information: institution's name, location, organizational units offering related programs (academic department, center, and laboratory), types and names of courses covering hydrogen economy and fuel cell technology topics, descriptions of the research programs and courses, and names of faculty and research members affiliated with the program. This database will be linked to a database containing records of over 300 faculty and research members as well as their research interests, and full contact information like mailing address; email; homepage links; affiliated school; and academic department, center, or laboratory links.

The catalog should be useful to many audiences, including educators (teaching faculty, counselors and advisors) who are looking for new career opportunities in research and teaching, students (undergraduate and graduate, current and prospective students) searching for educational and research programs that fit their interests, and business

entrepreneurs seeking new technologies in research centers. Stakeholders such as state and local governments needing objective and accurate information in order to make informed decisions about sponsoring certain programs will also find the catalog useful.

Conclusions

The catalog promises to become an essential instrument in the search for hydrogen- and fuel-cell-related educational opportunities for a broad spectrum of users. It may also be a useful tool for measuring the current status of hydrogen and fuel cell education and may provide a baseline for planning to expand hydrogen and fuel cell education programs. Government agencies such as DOE could use the catalog as a reference point in measuring the effectiveness of upcoming efforts to raise awareness and public support.

As hydrogen research and education expands, new information about programs, courses, and educators involved in activities related to hydrogen and fuel cells will be added to the catalog. Additional tables will be made available through links, making the database more comprehensive for educators, students, government agencies, and perhaps the general public.